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## HYDRAULIC ENGINEERING IN FRENCH WEST AFRICA

GENERAL PROGRESS IN VARIOUS TERRITORIES -- Dakar, Cette Semaine, 1 Jan 53

In general, satisfactory progress has been made in urban hydraulic engineering construction in the various territories of French West Africa. The urgent problem of finding adequate water sources to supply the eight territorial capitals and about a dozen more important cities has already been solved. Work is now under way on the actual water-supply installations of the cities concerned. This work is now more urgent than ever because of the rapid development of some of the cities in question, particularly Conakry and Abidjan.

Large-scale river-development projects, except for the Richard Toll project, are still largely in the study phase. However, the study of these projects is being actively pursued, despite a shortage of qualified personnel. Of the five river basins currently under consideration for eventual development, the study of the Senegal, Niger, Oueme, and Lower Guinea basins is progressing satisfactorily. The study of the Volta Noire basin has been retarded by a shortage of specialized engineers.

Much has already been accomplished in the pastoral and agricultural hydraulic engineering fields, but much more remains to be done. Even better results are anticipated when the Services de l'Agriculture et de l'Elevage (Agricultural and Stock Raising Services) and the Service de l'Hydraulique (Hydraulic Service) begin to work in closer cooperation. During the last 2 years, special progress has been made in pastoral hydraulic engineering throughout French West Africa, although more particularly in Senegal and Niger. A more concentrated effort in the future is anticipated in Mauritania and the French Sudan. Meanwhile, in recent months, the territorial units of the Service de l'Hydraulique have been given additional engineers and topographers and, as a result, further development is anticipated generally in agricultural hydraulic engineering.

## Senegal

The most important urban hydraulic engineering problem in Senegal consists in the water-supply and sewage systems of Dakar. After several years of effort, this problem is now largely solved. The only problem left is that

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of financing the project for conveying water from Behikhotane to Dakar, which will cost one billion CFA francs and will increase the daily water supply of Dakar from 30,000 to 60,000 cubic meters.

Saint Louis has an adequate daily water supply amounting to between 5,000 and 6,000 cubic meters.

At Thies, the first phase of the water-supply project currently under way is nearly complete. A drilling of great depth, which is expected to double the city's present water supply, is yet to be completed.

Studies are currently being made to extend the water-supply systems of Kaolack and Ziguinchor.

The pastoral and agricultural hydraulic engineering program undertaken throughout Senegal a few years ago is being carried out satisfactorily. On 1 January 1952, FIDES (Fonds d'Investissements et du Developpement Economique et Social, Economic and Social Investment and Development Fund) allocated 556 million CFA francs for 34 scheduled new drillings.

#### Mauritania

At present, Rosso receives its water supply from the waters of the Senegal River, which are collected by dams during the flood season. Construction of a reservoir with a capacity of 300 cubic meters, a purification station, and a distribution system is now under way.

Two apparatus (valued at a total of 40 million CFA francs) for distilling sea water have been ordered for Port Etienne. Their installation will be followed by the construction of a small water-distribution system. Port Etienne then will have a daily water supply of 100,000 liters. Meanwhile, research has shown that the soft water table in the Boutilimit area (Trarza region) extends into the Port Etienne region. It is possible that some of this water can be conveyed to Port Etienne by means of a pipeline between 40 and 60 kilometers long. The project is under consideration.

The Mauritania section of the Service de l'Hydraulique of French West Africa was set up only 2 years ago. During this time, despite a shortage of qualified personnel and insufficient funds, it has built excellent water wells in the Boghe, Kaedi, and Akjoujt regions.

#### French Sudan

Two water-supply systems are being built in Bamako: one in the upper and the other in the lower section of the city. Two reservoirs are also under construction. The entire project is now nearing completion. A pumping station has already been installed, and only the necessary water-purification facilities remain to be provided.

Gao will get its water supply from the Niger. A reservoir with a capacity of 500 cubic meters, which was nearing completion, was recently destroyed accidentally and is now being rebuilt.

Agricultural hydraulic engineering constitutes a difficult problem in the French Sudan. In the Gao region, along the Niger River and the Adrar des Iforas Mountains, surveys have brought to light the possibility of drilling wells and tapping water at a depth of 80 meters. Numerous wells have been built in the Bamako-Kokolani-Nara region, which, heretofore, had had none. A 4-year agricultural hydraulic engineering development plan has been worked out by the Directorate of Public Works of the French Sudan, which calls for the construction of wells and dams throughout the territory, particularly in the Gourma and Bandiagara regions.

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After long and costly research, Conakry is now assured of an adequate water supply. Water discovered on Kaloum Peninsula and in the Kamkimbon area can be brought to Conakry at the rate of about 10,000 cubic meters daily and at reasonable cost. It is estimated that the remaining work in this connection will cost between 100 million and 150 million CFA francs.

At Kankan, the Directorate of Public Works of French Guinea has worked out a water-supply plan which calls for tapping the waters of the Milo River and constructing a reservoir and a distribution system at a total estimated cost of 90 million CFA francs.

Studies are under way to develop agricultural hydraulic engineering construction in Lower Guinea as a means of improving the economy of all of French Guinea.

Abidjan, La Cote d'Ivoire, 31 Dec 52

Ivory Coast

Abidjan, which in 1950 had only a 20-minute water supply per day, is now getting an adequate water-supply system, the construction of which is well under way. Annexed supply systems have already been provided for the suburban towns of Treichville and Cocodi, where reservoirs with a capacity of 2,000 cubic meters each are currently under construction. When this work is completed, attention will turn to the problem of purification.

After studying the problem of Sassandra's water needs, it has been decided to supply the city with water from the Sassandra River. The necessary pipes and purification apparatus are on order, and the reservoirs are currently under construction.

At Bouake, drillings for water are being made with satisfactory results.

Another hydraulic engineering project of special interest is the projected construction of a dam at Ayame, on the Bra River, to supplement the present electric power supply of Abidjan. The dam, which will take about 4 years to build and will be ready for operation in 1957 or 1958, will cost an estimated 3 billion CFA francs.

Upper Volta

At Bobo Dioulasso, the tapping of the Kou River and the necessary storage installations have been completed, and the city's distribution system will be completed by the end of 1953. The present water supply amounts to approximately 2,000 cubic meters daily.

Construction of two dams at the confluence of the Volta Noire and Sourou rivers will make possible the irrigation of more than 100,000 hectares of land.

Paris, Encyclopedie Mensuelle d'Outre-Mer, Jan 53

Niger

Important results were obtained in 1952 by the Niger section of the Service de l'Hydraulique of French West Africa, which took over from the various district administrations responsibility for a major portion of the water-well building program in the territory.

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In 1952, the Service de l'Hydraulique began work on 109 new water wells (totaling 1,935 meters in depth) in the following cercles: Agades, 13; Zinder, 30; Dosso, 12; Goure, 12; Maradi, 7; N'Guigmi, 4; Niamey, 6; Tillaberi, 10; and Tahoua, 15. It is estimated that new wells, representing a total depth of 350 meters, were put in service during the fourth quarter of 1952. During the year, the Service de l'Hydraulique also repaired 32 wells which were damaged or in disrepair.

Abidjan, La Cote d'Ivoire, 29 Oct 52

Dahomey

Since 1949, studies and works have been undertaken to improve the hydraulic engineering potential of Dahomey, particularly insofar as irrigation and drinking-water distribution are concerned. During 1949 and 1950, drinking-water supply systems were provided for the rural towns of Adjehon, Salsete, and Natitingou. In 1951, the newly established Dahomey section of the Service de l'Hydraulique of French West Africa undertook a general program of urban, rural, fluvial and pastoral hydraulic engineering development.

At Porto Novo (30,000 inhabitants), a 60-meter seepage well was completed recently. It is anticipated that it will provide 3,600 cubic meters of water daily, an amount amply sufficient to satisfy the city's needs, which are estimated at 1,800 cubic meters daily.

At Cotonou, it took no less than seven 80-meter drillings in an area 14 kilometers long to find the 2,000 cubic meters of soft water needed daily.

At Ouidah, third largest city in Dahomey, drillings for water are being made with satisfactory results.

The water-supply problem is especially serious in the brush country. In the villages of southern Dahomey, it has proved relatively easy to build wells, but in the northern section of the territory and in cities and towns, deep drillings are necessary to strike water. During the past 2 years, 20 modern seepage wells, some of which are as much as 90 meters in depth, have been built in southern Dahomey. Meanwhile, three large seepage wells, two of which are nearing completion, are expected to satisfy the water requirements of Parakou, principal town of northern Dahomey. In the extreme north of the territory, seven wells have been built at Kandi, while construction of the Agrado River dam provides the town of Savalou with a reserve of 45,000 cubic meters of water for the dry season. Moreover, to increase livestock throughout Dahomey, a program has been planned, as part of the next 4-year development plan, calling for construction of a dam, 64 wells, and 68 watering places.

NIANDAN DAM TO INCREASE NAVIGABILITY OF NIGER RIVER -- Dakar, Paris-Dakar, 19 Jan 53

At present, the Niger River in the French Sudan is navigable only 3 or 4 months annually. When its minimum rate of flow is between 400 and 450 cubic meters per second, navigation is possible on the following sections: Kouroussa-Bamako, Koulikoro-Segou, and Markala-Timbuktu. To meet the requirements of the economy of the French Sudan, the Niger River must be navigable at least 10 months per year, which means that for that period of time, its flow must be kept at a minimum of between 400 and 450 meters per second. To accomplish this, plans have been made to build a dam on the Niandan River, a right bank tributary of the Niger River, about 15 kilometers upstream from the confluence of the two rivers. At that point, the Niandan crosses a mountain chain through a comparatively narrow passage.

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It is estimated that the projected dam will be 1,150 meters long, 42.50 meters high at its highest point, and 7 meters wide at the crest. Its normal water-holding capacity will be about 5 billion cubic meters. The dam will cost 4,400,000,000 CFA francs (estimate based on the value of the CFA franc at the beginning of 1951).

**OUEME RIVER VALLEY BEING DEVELOPED -- Conakry, La Guinee Francaise, 25 Nov 52**

Some time ago, in 1952, the administration of Dahomey established the so-called Mission d'Amenagement de l'Oueme (Oueme Development Mission) to develop the Oueme River valley for crop cultivation. The mission operates in conjunction with the Service d l'Hydraulique and the Directorate of Public Works of Dahomey.

The mission's headquarters are located in Porto Novo, where it has offices, a warehouse, a landing platform on the lagoon, a slipway, and several motor boats.

In its research and planning, the mission gets the collaboration of several organizations, the most notable of which are: the BCEOM (Bureau Central d'Etudes pour les Equipements d'Outre-Mer, Central Office of Studies for Overseas Equipment); the ORSOM (Office de la Recherche Scientifique Outre-Mer, Office of Overseas Scientific Research); the IGN (Institut Geographique National, National Geographic Institute); the IRHO (Institut de Recherches pour les Oleagineux, Oleaginous Plant Research Institute); the CGCT (Compagnie Generale pour les Oleagineux Tropicaux, General Company for Tropical Oleaginous Products); and the Mission Hydrographique de la Cote d'Afrique (Hydrographic Mission of the African Coast).

Thus far, the Mission d'Amenagement de l'Oueme has performed the following work:

1. In the hydrological field, it has set up 6 research bases, 23 flood gauges, 15 overflow gauges, and 20 measurement stations in the upper basins of the Oueme River and its tributaries.
2. With the assistance of the IGN, it has made aerial photographic surveys of the area under study. These surveys will result in photo maps with a scale of 1:20,000.
3. It has undertaken studies to determine the most suitable crops to cultivate in the area. It was assisted by the IRHO in research relating to oil palm cultivation and by the local agricultural services in research relating to the cultivation of food crops, particularly rice.
4. It has made a study of the entire development project from the engineering standpoint, with the assistance of a BCEOM engineer, whose report will be submitted shortly.

On the basis of studies completed to date, in the initial phase of the development project, the Mission de l'Amenagement de l'Oueme plans to set up seven areas of cultivation between the confluence of the Oueme and Zou rivers and Lake Nokoue, as follows:

**Area I**

Total area, 2,000 hectares; usable area, 1,500 hectares; crop, oil palm.

**Area II**

Total area, 5,400 hectares; usable area, 4,300 hectares; crop, oil palm.

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Areas III, IV, and V

Total area, 7,300 hectares; usable area, 4,300 hectares; crops, oil palm (60 percent) and rice or corn (40 percent).

Areas VI and VII

Total area, 10,200 hectares; usable area, 6,600 hectares; crops, corn during the dry season and rice during the wet season.

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